



Retail

Enabling Dynamic Order Fulfilment with inventory optimization

Big Picture

One of the biggest US sporting goods company wanted to understand the inventory placement in the network with ever-increasing complexities of retail fulfilment for BOPIS and e-commerce orders. With inventories spread across the network, fulfilling customer orders came with a trade-off for order-splits, increased transit times and higher fulfilment cost.

With a constant focus on innovation and customer-centricity, the retailer asked Fractal to help transform its ability to optimize inventory and improve speed-to customers with timely delivery and reduced fulfilment costs.

Industry

Retail and E-commerce

Challenge

Inventory optimization for dynamic order fulfilment

Solution

Fractal developed an end-to-end solution on the Google Cloud Platform, bringing together technology, AI, engineering, and design.

Transformative Solution

The retailer receives the following type of customer orders:

- Buy online and deliver from store or Market Fulfilment Center (BODS)
- Buy online and pickup in the store (BOPIS)
- Offline customer orders at stores

Fractal solved the client's problem by leveraging dynamic order fulfilment through optimizing the fulfilment from stores (MFCs). Fractal not only transformed but also re-designed the distribution network plan for optimal fulfilment with a three-step solution framework.

1. Prioritization of business rules

- Pattern recognition of historical orders & items.
- Identifying customer responsive network with prioritization of fulfilment centers.
- Over imposing the ideal network recommendations with business context, preferences & store-merchandising rules.

2. Optimal inventory placement and guidance

- Multi objective optimization function for reduced transit times and lower fulfillment costs.
- Derived inventory guidance at SKU Store / DC level for the optimized network and constraints viz., store throughputs, store product handling type & transit time

3. Dynamic order allocation & fulfilment

- Order fulfilment engine to dynamically allocate orders (in near real time) with inventory guidance across network.
- Scenario planning for minimized transits or costs or both
- Interactive dashboard for virtual representation of inventory network and order fulfilment with easy plug-and play scenarios

The Change

The initiative was to develop a solution for the retailer that combined innovation, integration, analytics and automation. The resulting solution transformed the business process with an experience-driven, cloud-hosted application to provide immediate and relevant insights. The solution automates inventory management in two ways. First, it integrates data from different sources on the cloud, eliminating the effort of tracking data manually. The process is automated, and insights are received in real-time in a cloud-based dashboard. Second, it recommends inventory guidance as per historical order patterns and thus helps in reducing fulfilment cost.

The solution creates current and forward-looking views for inventory optimization. This aid in improved management and hence more effective information on managing stocks.

Key changes:

- Increased 1-day transit shipments by 40% thus increasing speed-to customers
- 20% reduction in fulfilment costs since 99% of shipment deliveries were recommended within 1 or 2 transit days. With the desired inventory placed at each store, it helped reduce the number of split shipments.
- The solution transformed inventory distribution for over 5000 products at a subclass level, 900 customer zips & 500 fulfilment zips.

This solution is a significant step-change in managing optimized performance analysis. It is one of the largest and most complex for any retailer in the global space. This innovative solution helped in driving significant efficiencies in fulfilment.

The Implementation

The solution was built on Google Cloud Platform (GCP), leveraging elements like Google Big Query, Google Cloud Storage, Google Virtual Machine and Google Data Studio. This was a large-scale optimization considering the entire US network in scope with inventory recommendation across the store-SKU level. Fractal explored and leveraged a combination of advanced optimization techniques like genetic algorithm, simulated annealing, linear programming and a few commercial solvers like CPLEX, Gurobi, Llamasoft and Express FICO to arrive at the final solution.

The solution helped the client in setting inventory guidance not only for the year but also for seasonal patterns and achieving the desired customer service level.

Agile, digital and scalable solution drove value for the business. Fast insights for fast decisions, enhanced the ability to generate growth for the client.